lems comes usually from specialists. Indeed, only in rare instances is the significance of the results of scientific research apparent to farmers, since newly discovered facts are seldom directly applicable to agricultural conditions. The suggestive or the indirect value of reports of new work is usually of paramount economic importance; it is the purpose of the *Journal of Agricultural Research,* therefore, to record investigations bearing directly or indirectly upon economic conditions of agriculture." According to the foreword the journal for the first few issues will contain papers from the Department of Agriculture only. The later numbers, however, will probably include articles prepared and submitted by investigators in the state agricultural colleges and experiment stations. The book is highly technical in character and will not be circulated except among scientific specialists.

OCEANOGRAPHIC CRUISES OF THE U. S. FISHERIES SCHOONER "GRAMPUS" 1912–1913

IN the advance of the modern science of oceanography the coastal waters of the eastern seaboard of the United States have received little attention. But the introduction of new fishery methods, and the frequent reports of a diminution of food fishes along our coast add an economic to the purely scientific need for a close study of the physical features, and plankton, of our waters, such as has long been prosecuted in the North Sea by the nations bordering upon it. A beginning has been made along these lines by the U. S. Bureau of Fisheries, with the cooperation of the Museum of Comparative Zoology. And during the past two summers the Fisheries schooner *Grampus* has been detailed, in my charge, for oceanographic cruises which have so far extended from Nova Scotia to Chesapeake Bay, a brief outline of which is given here. In both years Mr. W. W. Welsh, of the bureau, has acted as my assistant.

In a sailing vessel, which the *Grampus* is primarily in spite of a small auxiliary gasoline engine, oceanographic work is necessarily carried on under difficulties. But there was no steamer available. And fortunately we have enjoyed such exceptionally fine weather on both cruises that we worked to better advantage than might have been expected. Such operations as require the vessel to be stationary for any length of time, for example current measurements, were usually performed from a dory at anchor, though occasionally, if the sea was too rough, we anchored the vessel herself for this purpose. For hoisting purposes a gasoline winch was installed on deck. The equipment of the *Grampus* consisted, in 1912, of Negretti and Zambra reversing deep-sea thermometers, a Sigsbee and a stopcock water bottle; an Ekman current meter, a closing net for horizontal towing, described elsewhere,[1] quantitative nets of the Hensen pattern, a variety of ordinary tow nets, large and small, of various grades of silk, and an eight-foot beam trawl.

In 1913 we added a second current meter, two more stopcock water-bottles, a Helgoland "shear board" tow net, which proved to be the most effective of our nets, a three-foot tow net of the *Michael Sars* pattern and a Lucas sounding machine. On the other hand, we discarded the Sigsbee water bottle, which proved unreliable, and substituted an otter trawl for the beam trawl, a change which proved very advantageous.

In 1912 our cruise lasted from July 8 until August 31. We chose the Gulf of Maine as our first field of work partly because of its important fisheries, partly because it was nearly virgin ground so far as sub-surface temperatures, salinities and plankton were concerned, but chiefly because, being a partially isolated area, a comparatively complete survey could be made in the time at our disposal. The stations were planned to include Massachusetts Bay, the deep basin off Cape Ann and Cape Cod, the coastal waters and off-shore banks along the coast of Maine, and a line from Cape Elizabeth to Cape Sable, while a week was spent trawling in and near Casco Bay in cooperation with the Harpswell

[1] *Int. Rev. Hydrobiol. Hydrogr.*, 5: p. 576, 1913.

Marine Laboratory. During the cruise forty-six off-shore stations were occupied, at which 130 tows were made with the various nets; quantitative hauls were made at sixteen stations; the dredge or trawl used at fourteen; serial temperatures were taken at thirty-nine, bottom, intermediate and surface water samples at 37, while 38 current measurements were made. The surface temperature was recorded hourly, and the color of the sea noted by the Forel scale.

On our return to port the salinities of the water samples were obtained by titration with nitrate of silver, the use of floating hydrometers having been abandoned as wholly unreliable.

In November, 1912, operations were resumed on the steamer *Blue Wing,* which acted as tender to the *Grampus* during her fish-cultural operations of the winter. By the courtesy of the Bureau of Fisheries I was enabled to make stations on the *Blue Wing* bi-monthly until April, 1913, in Massachusetts Bay, taking the usual serial temperatures, serial water samples and tows. And during March, April and May, 1913, this work was greatly advanced by Mr. W. W. Welsh, of the Bureau of Fisheries, who took temperatures, water samples and surface tows at numerous stations between Cape Ann and Boon Island, while investigating the spawning habits of the haddock.

We laid out a more ambitious program for our summer cruise in 1913 than in the preceding year, planning to cover the cool coastal water between the coast and the Gulf stream, from Cape Cod to the mouth of Chesapeake Bay, besides repeating, in a general way, our stations of 1912 in the Gulf of Maine. The object of the latter part of the work was, of course, to trace the changes which might take place there from year to year.

On July 7, the *Grampus,* again in my charge, sailed southward from Gloucester. And we were now able to work in much greater comfort than before, an excellent laboratory having been constructed on board during the winter. Our course took us to the western edge of Georges Bank, where we made our second station, thence directly to the edge of the Gulf stream south of Nantucket Shoals Light Ship. We then proceeded southwestward along the coast in a zigzag course, occupying a station every 45 miles or so, and running three sections across the coastal bank to the Gulf stream over the continental slope. On July 24 we reached the Chesapeake, and anchored in Norfolk to refit.

During this part of the cruise three stations were devoted to current measurements, off Long Island, Cape May and Chincoteague, observations being taken hourly, at surface and bottom, for six hours at each station. The first was timed to include parts of both flood- and ebb-tides, the last two together covered an entire flood and nearly an entire ebb.

We left Norfolk July 29, reached Gloucester August 4, and put to sea again for the Gulf of Maine on August 9. We now ran from Cape Ann to Cape Sable, and besides making stations en route, turned aside to visit Jeffreys Bank and the deep trough off Platt's Bank. We then turned northward, crossing the mouth of the Bay of Fundy, and followed the coast back to Gloucester, where we arrived on August 15. During the summer's cruise complete oceanographic observations, including serial temperatures and serial water samples, were taken at 50 stations. And thanks to our ample supply of water bottles, water samples were taken at from 3 to 5 levels at every station. One hundred and sixty-five tows were made with the various plankton nets, including 15 hauls with the quantitative net, the latter all in the Gulf of Maine, and the otter trawl was used at 10 stations. It may be of interest to note that the distance traveled was about 2,100 miles.

The plankton collections gathered during 1912 and 1913 are very extensive, and as varied as the large ocean area traversed would suggest, fish fry and eggs, copepods, hyperiid amphipods, schizopods, sagittæ, pteropods, medusæ and diatoms being especially well represented. And the oceano-

graphic data afford a fairly comprehensive survey, for the summer months. As yet our winter data are confined to Massachusetts Bay, and the region just north of Cape Ann, but it is proposed to continue the work at other seasons in future years. The reports on the oceanography, with preliminary accounts of the plankton, are being prepared in the Museum of Comparative Zoology, those for the summer of 1912 being now in press. And the more important groups of pelagic organisms have been distributed to specialists who have undertaken the task of reporting on them.

It would be premature to discuss the scientific results of the cruises here. But passing notice may be called to our demonstration of the fact, long ago suspected by Verrill, that the low surface temperatures of the northeastern part of the Gulf of Maine do not indicate the direct influence of an Arctic current, as has so often been suggested, but are merely the evidence of the strong tidal currents, which cause a more or less complete vertical mixing of the water. Where the gulf is coldest on the surface, it is warmest at the bottom, depth for depth, and *vice versa*. This process reaches its extreme in the Grand Menan Channel, and on German Bank, where the physical characters of the water are practically uniform from surface to bottom. Mention has already been made in the daily press of our discovery of extensive beds of the sea scallop (*Pecten magellanicus*) off the coasts of New York, New Jersey and Maryland. And this promises a new fishery of such importance that the *Grampus* was dispatched southward once more, on August 20, 1913, in charge of Mr. W. W. Welsh, for a two weeks' survey of the beds.

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SPECIAL ARTICLES

ECTO-PARASITES OF THE MONKEYS, APES AND MAN

FOR several years I have been urging the thesis that the host distribution of the wingless, permanent ecto-parasites of birds and mammals is governed more by the genetic relationships of the hosts than by their geographic range, or by any other ecologic conditions. In numerous papers, and particularly in a recent[1] one surveying all the known records of the occurrence of Mallophaga on birds, I have offered evidence to support this thesis.

Now, if this contention is sound, the converse of the statement is also true. That is, the kinds (genus, species, etc.) of permanent ecto-parasites found on birds and mammals will indicate in some measure the genetic relationships of the hosts. If, for example, ornithologists have before their eyes certain birds of doubtful relationships, as the hoatzins of South America, or the whole family of owls, they may well pay respectful attention to the kinds of ecto-parasites harbored by these hosts. I have, indeed, pointed out, in the paper just referred to, some suggestive specific cases of this sort.

The wingless, permanent ecto-parasites of birds and mammals are of two groups, namely, the biting lice, Mallophaga, feeding on the feathers and hair, and the sucking lice, Anoplura, feeding on blood. Certain mites (Acarina) may perhaps also be assigned to this category of permanent wingless parasites, but the fleas can not be, for they hop on and off their host, and all their immature life is non-parasitic and wholly apart from their future hosts. The Mallophaga, of which nearly 2,000 species are now known, occur chiefly on birds, while the Anoplura, of which less than 100 are known so far, are confined to mammals.

As my own study of these ecto-parasites has been almost exclusively restricted to the Mallophaga I have not been able to illustrate or bolster up my thesis with many examples derived from conditions among the mammals, but the recent careful work of Fahrenholz (Hanover) and Neumann (Toulouse) on the determination and distribution of certain genera and species of Anoplura makes it possible to point out an especially interesting case of host and parasitic relations which is

[1] "Distribution and Species-Forming of Ecto-Parasites," *Amer. Nat.*, Vol. 47, pp. 129–158, March, 1913.